

## **REDUDANT POWER SUPPLY WIRELESSLY CONNECTED TO MOTHERBOARD**

### **FIELD OF THE INVENTION**

The present invention relates to a redundant power supply that is  
5 wirelessly connected to a motherboard, more particularly to a  
redundant power supply that is used in a computer system such as a  
server, a disk array, or a desktop personal computer.

### **BACKGROUND OF THE INVENTION**

To cope with the blooming information industry, various  
10 electronic products tend to introduce all kinds of integrated  
computer devices with different configurations to meet user's  
requirements. Since the general desktop computer, notebook  
computer, or standalone server has saturated data storage capacity  
and lacks expandability, the integrated design of external storage  
15 devices (such as redundant array of independent disk drives)  
becomes a key point for the research and development of the  
information industry.

Please refer to FIG. 1 for an illustrative diagram of the present  
external storage device, which has an integrated structure  
20 comprising several basic electronic modules such as an information  
storage unit, a power supply unit, a logic and arithmetic unit, a heat  
dissipating unit, and a bus connecting unit. Compared with the  
general single storage device (such as a removable hard disk rack),  
the main point of consideration for the integration relies on the  
25 external storage device having an external power supply for the

power and its application, and also having a heat dissipating unit to keep the internal storage device at a specific temperature and maintain the operating performance. However, the assembling of this kind of device still remains unchanged from the electric 5 connection mode of a general computer system. Besides using a detachable connection mode to accomplish the convenience of a wireless connection, the data storage unit still needs a power cable or a bus cable for the connection between the arithmetic logic unit, the heat dissipating unit, and the bus connecting unit. First of all, 10 such assembly not only involves long working hours and complicated manufacturing process, but also makes the maintenance or repair very difficult when the system or any component fails. The whole casing of the main system has to be removed first before the cable can be removed for maintenance and 15 repair, and thus it is difficult to accomplish the hot-plug function.

Furthermore, since the cable is too long, a certain space must be reserved for accommodating the remaining cable when designing the computer casing. As a result, the overall volume of the device cannot be minimized to a size convenient for disposition or 20 transportation, and definitely cannot comply with the trend of a compact product design. In addition, the isolation of the remaining cable will cause a poor performance on extracting the hot air produced by the interior heat generating units and directly affecting the operation and performance of the external storage 25 device.

## **SUMMARY OF THE INVENTION**

The primary objective of the present invention is to solve the aforementioned problems and eliminate the drawbacks of cited prior art. The present invention makes use of a card insertion 5 mode to wirelessly connect at least two power supplies and a motherboard for the main computation and control. Through a first component disposed on the rear panel of the power supply for electrically connecting each power supply, a second component disposed on the rear panel of the power supply, and a third 10 component for electrically connecting to the second component with the connection specification compatible with the second component, a redundant power supply that does not require any wire material for the installation is constituted.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

- 15 FIG. 1 is a perspective diagram of a prior art.
- FIG. 2 is a perspective diagram of the present invention.
- FIGS. 3A~3C are illustrative diagrams of the disassembled parts of the structure according to the present invention.
- 20 FIG. 4 is an illustrative diagram of assembling the rear panel, motherboard, and power supply according to the present invention.
- FIG. 5 is a side-view diagram of the assembled structure of the present invention.
- FIG. 6 is an illustrative diagram of another preferred embodiment of the present invention.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Please refer to FIGS. 2, 3A~3C, 4, and 5 for the present invention. In the figures, the present invention makes use of a 5 card insertion mode to wirelessly connect at least two power supplies 70 and a motherboard 50 for the main control and computation. Such arrangement reduces the use of traditional cables for the connection, and allows components such as the motherboard 50, rear panel 30, and the power supply 70 to have 10 better heat dissipation space and convenient assembling, in which the casing for accommodating the redundant power supply 70 comprises:

- 15 a main rack 10 including a front panel 11, a rear panel 12, and a bottom panel 13, and said main rack 10 using two side panels 14 to define an upper space and a lower space, and a track 101, 102 being used to define a plurality of accessing spaces for accommodating a plurality of data storage units 60 and the power supplies 70, and a fixing plate 141 having a fixing pillar 142 being bent from the inner edge of the two side panels 14;
- 20 a secondary rack 20, having two side edges corresponding to two side panels 14 coupled to a fixing plate 21 extended and bent from the lower space, and comprising a fixing pillar 211 to couple to a rear panel 30 at the rear of the power supply 70, a fixing hole 22 disposed on the secondary rack 20, and a protruded fixing pillar 25 131 disposed on the bottom panel 13 at a position corresponding to the fixing hole 22;

an upper partition 40, installed above the two side panels 14, and comprising an insert opening 41 disposed on the upper partition 40 at the position of the fixing plate 141 of the two side panels 14 such that a motherboard 50 being inserted from the insert opening 41 5 into the rear panel 30 and mounted on the fixing pillar 142 of the fixing plate 141.

Through a first component 31 disposed on the rear panel 30 for electrically connecting each power supply 70, a second component 32 disposed on the rear panel 30, and a third component 51 10 disposed on the motherboard 50 for electrically connecting to the second component 32 with the connection specification compatible with the second component 32, a casing for the redundant power supply 70 that does not require any wire material for the connection is constituted.

15 When each component is assembled, the fixing hole 22 of the secondary rack 20 aligns precisely to the protruded fixing pillar 131 on the bottom panel 13, and let the secondary rack 20 lean against the two side panels 14, and then pass a fixture (not shown in the figure) through the fixing hole on two connecting plates 21 such 20 that the secondary rack 20 is mounted at the lower backside of the two side panels. At that time, inert the motherboard 50 from the insert opening 41 of the upper partition 40 and pass it through the third component 51 to define a gold finger mode, and the third component 51 on the motherboard 50 is in the connecting port and 25 slot mode. Therefore, when the motherboard is inserted, the

motherboard will be electrically connected to the second component 31 and the third component 51. The fixture is used to pass through the fixing pillar 142 on the fixing plate 141 in order to fix the motherboard 50. If the height of the motherboard 50 exceeds the 5 upper partition 40, then the upper partition 40 at the position of the insert opening 41 can be bent to form a connecting plate 42. Similarly, a fixture is passed through the upper section of the motherboard 50 so that the motherboard 50 can be secured inside the casing.

10 After the motherboard 50 and the rear panel 30 are installed, users can detach a data storage unit 60 (such as a hard disk) from a track 101 at the space of a fifth component 52 on the motherboard 50 or assemble it to form an electric connection. Two or more power supplies 70 can be inserted into the rear panel 30 through the 15 track 102 at the lower space to obtain the connecting port and slot mode similar to that of the first component 31. Such arrangement constitutes an electric connection and a redundant power supply 70.

It is noteworthy that the power supply 70 is vertically and electrically connected to the rear panel to fit the size of the 20 motherboard 50 and the user's accessing habit; and the motherboard is horizontally and electrically connected to the rear panel 30.

Further, the rear panel 30 adds a fourth component 33 for connecting a compatible circuit board 81, and such circuit board 81 has more than one power connector being connected to the external 25 power supply. The motherboard 50 further comprises a sixth

component 53 for connecting to the heat dissipating fan 90 and a seventh component 54 for connecting to a bus module 100 with a main purpose of connecting each electronic module without using additional wire materials, and enhance the practicability of this 5 invention.

At present, there are not too many power connectors 80 adopting wireless connection in the market, and the main reason relies on the external power supply and power connector 80 are usually disposed at the lower part of the casing, which has less impact on the upper 10 heat dissipating fan 90. Therefore, this invention can use cables to connect the power connector 80 as shown in FIG. 6, and the connection of the rest of the electronic modules are wireless.

In summation of the above description, this invention adopts the card insertion mode to wirelessly connect at least tow or more 15 power supplies 70 and a motherboard 50 for the main computation and control, not only saving the extra cables for installing the redundant power supply 70, but also wastes no installation time. This invention does not leave any remaining cable, and thus the 20 heat dissipating fan 90 can make the convection of air and the dissipation of heat smoother inside the casing, not mentioning the convenience of assembling and maintaining computers.

While the present invention has been described in connection with what is considered the most practical and preferred embodiment, it is understood that the invention is not limited to the 25 disclosed embodiments but is intended to cover various

arrangements included within the spirit and scope of the broadest interpretation and equivalent arrangements.